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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/745,795	12/26/2000	Yasuki Iizuka	PADE: 056	2568

7590 07/22/2004

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EXAMINER	
JACKSON, JAKIEDA R	

ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 07/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/745,795	IIZUKA, YASUKI	
	Examiner	Art Unit	
	Jakieda R Jackson	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 December 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claims 1, 10 and 16** are rejected under 35 U.S.C. 102(e) as being anticipated by Abe et al. (U.S. Patent No. 6,173,253), hereinafter referenced as Abe.

Regarding **claim 1**, Abe discloses a character string dividing system for segmenting a character string into a plurality of words (sentence delimited into individual words; column 5, lines 36-38), comprising:

input means (figure 23; element 2304) for receiving a document (column 14, lines 28-35);

document data storing means (figure 23; element 2303) serving as a document database for storing a received document (column 3, lines 45-49);

character joint probability calculating means (transition probability) for calculating a joint probability of two neighboring characters appearing in said document database (column 8, lines 40-41);

probability table storing means (dictionary of transition between words; figure 2, element 132) for storing a table of calculated joint probabilities (column 8, lines 30-37);

character string dividing means (delimiting individual words) for segmenting an objective character string (input sentence) into a plurality of words (individual words; column 5, lines 35- 42) with reference to said table of calculated joint probabilities (figure 2); and

output means (figure 23, element 2305) for outputting a division result of said objective character string (column 3, lines 43-45 with figure 7, element 704).

Regarding **claim 10**, Abe discloses system comprising:

input means (figure 23, element 2304) for receiving a document (column 14, lines 28-35);

document data storing means (figure 23, element 2303) serving as a document database for storing a received document (column 3, lines 45-49);

character joint probability calculating means (transition probability) for calculating a joint probability of two neighboring characters appearing in said document database (column 8, lines 40-41);

probability table storing means (dictionary of transition between words; figure 2, element 132) for storing a table of calculated joint probabilities (column 8, lines 30-37);

word dictionary storing means (word dictionary) for storing a word dictionary prepared or produced beforehand (preparing a dictionary; column 1, lines 65-67);

division pattern producing means (candidate extraction process) for producing a plurality of candidates (extracting candidates) for a division pattern of an objective

character string (sentence) with reference to information of said word dictionary (vocabulary dictionary; figure 2, element 131; column 4, lines 44-53 with figure 10; column 8, lines 42-46);

correct pattern selecting means for selecting a correct division pattern (select an optimal result) from said plurality of candidates (characters, words or sentences; column 9, lines 1-12) with reference to said table of character joint probabilities (column 8, lines 30-37); and

output means (figure 23, element 2305) for outputting said selected correct division pattern as a division result of said objective character string (column 3, lines 35-42 with figure 7, element 704).

Regarding **claim 16**, it is interpreted and rejected for the same reasons as set forth in the combination of claims 1 and 10.

3. **Claims 2 and 7-8** are rejected under 35 U.S.C. 102(e) as being anticipated by Halstead, Jr. et al. (U.S. Patent No. 5,963,893), hereinafter referenced as Halstead.

Regarding **claim 2**, Halstead discloses a character string dividing method for segmenting a character string (breaking a text string) into a plurality of words (into separate words; column 3, lines 52-54), said method comprising the steps of:

statistically calculating a joint probability of two neighboring characters (statistical probabilities for breaking bigrams; column 4, lines 25-32) appearing in a given document database (column 5, lines 16-25); and

segmenting an objective character string (breaking a text string) into a plurality of words (into separate words; column 3, lines 52-54) with reference to calculated joint probabilities (adjacent characters to the bigram phrase break probabilities; column 6, lines 19-22) so that each division point (|) of said objective character string (figure 6) is present between two neighboring characters having a smaller joint probability (figure 8, element 66).

Regarding **claim 7**, Halstead discloses the method wherein said division point (|) of said objective character string (figure 6) is determined based on a comparison between the joint probability (adjacent characters to the bigram phrase break probabilities; column 6, lines 19-22) and a threshold (column 9, lines 6-11 and lines 59-65), and said threshold is determined with reference to an average word length of resultant words (column 1, lines 21-25).

Regarding **claim 8**, Halstead discloses the method, wherein a changing point of character type (h, K, H and P) is considered as a prospective division point (periods are used to specify the breaks) of said objective character (column 10, lines 39-49).

4. **Claims 4-6** are rejected under 35 U.S.C. 102(e) as being anticipated by Yamamoto et al. (U.S. Patent No. 6,098,035), hereinafter referenced as Yamamoto.

Regarding **claim 4**, Yamamoto discloses the method comprising the steps of:

statistically calculating a joint probability of two neighboring characters appearing in a given document database (column 1, lines 57-66), said joint probability being

calculated as an appearance probability (partial/appearance probability; column 13, lines 32-34) of a first character string (ima) appearing immediately before a second character string (hi), said first character string including a former one of said two neighboring characters as a tail thereof (a) and said second character string including a latter one of said two neighboring characters as a head thereof (h; column 13, lines 45-51 with column 11, lines 45-58 with figure 8B); and

segmenting an objective character string into a plurality of words (words separated by word separators/spaces; column 1, lines 43-44) with reference to calculated joint probabilities (column 1, lines 57-66) so that each division point (separators; column 1, lines 43-44) of said objective character string is present between two neighboring characters having a smaller joint probability (figure 8B).

Regarding **claim 5**, Yamamoto discloses the method wherein said joint probability of two neighboring characters is calculated based on a first probability of said first character string (ima) appearing immediately before said latter one of said two neighboring characters (ima h) and also based on a second probability (hi) of said second character string appearing immediately after said former one of said two neighboring characters (a hi; column 13, lines 45-51 with figure 8).

Regarding **claim 6**, Yamamoto discloses the method comprising the steps of:

statistically calculating a joint probability of two neighboring characters appearing in a given document database (column 1, lines 57-66) prepared for learning purpose (column 13, lines 53-54); and

segmenting an objective character string into a plurality of words (words separated by word separators/spaces; column 1, lines 43-44) with reference to calculated joint probabilities (column 1, lines 57-66) so that each division point (separators; column 1, lines 43-44) of said objective character string is present between two neighboring characters having a smaller joint probability (figure 8B),

wherein, when said objective character string involves a sequence of characters not involved in said document database (unknown word not present in dictionary; column 2, lines 63-66), a joint probability of any two neighboring characters (character sequence) not appearing in said database (dictionary not used) is estimated based on said calculated joint probabilities (chain probability) for the neighboring characters stored in said document database (column 2, line 63 – column 3, line 28).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claims 3, 11-15 and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Halstead, Jr. et al. (U.S. Patent No. 5,963,893), hereinafter referenced as Halstead in view of Abe et al. (U.S. Patent No. 6,173,253), hereinafter referenced as Abe.

Regarding **claim 3**, Halstead discloses a character string segmenting (breaking a text string) into a plurality of words (into separate words; column 3, lines 52-54), said method comprising the steps of:

statistically calculating a joint probability of two neighboring characters (statistical probabilities for breaking bigrams; column 4, lines 25-32) appearing in a given document database (column 5, lines 16-25); and

segmenting an objective character string (breaking a text string) into a plurality of words (into separate words; column 3, lines 52-54) with reference to calculated joint probabilities (adjacent characters to the bigram phrase break probabilities; column 6, lines 19-22) so that each division point (|) of said objective character string (figure 6) is present between two neighboring characters having a smaller joint probability (figure 8,

element 66), but lacks wherein said joint probability being calculated as an appearance probability of a specific character string.

Abe discloses the method wherein said joint probability being calculated as an appearance probability of a specific character string appearing immediately before a specific character (specified characters), said specific character string including a former one (before) of said two neighboring characters as a tail thereof and said specific character being a latter one (after) of said two neighboring characters (column 6, line 35 – column 7, line 10), for easiness of access.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Halstead's invention such that said joint probability being calculated as an appearance probability of a specific character string, to allow an easy way to access character code in the dictionary (column 6, lines 43-45).

Regarding **claims 11 and 17**, Halstead discloses a method comprising the steps of:

statistically calculating a joint probability of two neighboring characters (statistical probabilities for breaking bigrams; column 4, lines 25-32) appearing in a given document database (column 5, lines 16-25);

storing calculated joint probabilities (storage for n-grams; column 1, lines 55-66);

segmenting an objective character string (breaking a text string) into a plurality of words (into separate words) with reference to a word dictionary (column 3, lines 52-60); and

that each division point (|) of said objective character string (figure 6) is present between two neighboring characters having a smaller joint probability (figure 8, element 66), but lacks wherein, when there are a plurality of candidates for a division pattern of said objective character string, a correct division pattern is selected from said plurality of candidates with reference to calculated joint probabilities so that each division point of said objective character string is present between two neighboring characters having a smaller joint probability.

Abe discloses the method wherein, there are a plurality of candidates for a division pattern (extracting candidates) of said objective character string (sentence; column 4, lines 44-53 with figure 10; column 8, lines 42-46), a correct division pattern is selected (select an optimal result) from said plurality of candidates (characters, words or sentences; column 9, lines 1-12) with reference to calculated joint probabilities (column 8, lines 30-37), to input character strings without having to specify the candidate words and/or characters.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Halstead's invention such that a correct division pattern is selected from said plurality of candidates with reference to calculated joint probabilities so that each division point of said objective character string is present between two neighboring characters having a smaller joint probability, to allow the input of long word in a sentences without disturbing continuity of thought and the increase in operability (column 1, lines 7-15).

Regarding **claim 12**, Halstead discloses the method wherein

a score of each candidate is calculated (scores are calculated; column 9, lines 6-11) when there are a plurality of candidates for a division pattern of said objective character string (breaking a text string; column 3, lines 52-54),

said score is a sum of joint probabilities at respective division points (statistic probability for breaking; column 4, lines 25-47) of said objective character string (text string; column 3, lines 52-54) in accordance with a division pattern of said each candidate (figure 6), and

a candidate having the smallest score is selected as said correct division pattern (figure 8, element 66).

Regarding **claim 13**, Halstead discloses the method wherein

a score of each candidate is calculated (scores are calculated; column 9, lines 6-11) when there are a plurality of candidates for a division pattern of said objective character string (breaking a text string; column 3, lines 52-54), and

a candidate having the smallest score is selected as said correct division pattern (figure 8, element 66), but lacks wherein said score is a product of joint probabilities at respective division points.

Abe discloses the method wherein said score is a product (column 8, lines 46-54) of joint probabilities (transition probability) at respective division points of said objective character string (sentence) in accordance with a division pattern of said each candidate (column 8, lines 37-60), to determine the optimal word in considering the context of a sentence.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Halstead's invention such that said score is a product of joint probabilities at respective division points, to allow the input of long words in a sentence without disturbing continuity of thought and the increase in operability (column 1, lines 7-15).

Regarding **claim 14**, Halstead discloses the method wherein

a calculated joint probability is given to each division point of said candidate (column 5, lines 41-55);

a constant value is assigned to each point between two characters not divided (each pair of adjacent characters; column 6, lines 19-24 and column 10, lines 1-9);

a score of each candidate (score assigned to each entry; column 10, lines 1-9) is calculated based on a sum of said joint probability (highest scoring path kept; column 9, lines 6-11) and said constant value thus assigned (column 10, lines 1-9); and

a candidate having the smallest score is selected as said correct division pattern (figure 8, element 66).

Regarding **claim 15**, Halstead discloses the method wherein

a calculated joint probability is given to each division point of said candidate (column 5, lines 41-55);

a constant value is assigned to each point between two characters not divided (each pair of adjacent characters; column 6, lines 19-24 and column 10, lines 1-9); and

a candidate having the smallest score is selected as said correct division pattern (figure 8, element 66), but lacks a score of each candidate is calculated based on a product of said joint probability.

Abe discloses the method wherein a score of each candidate is calculated based on a product (column 8, lines 46-54) of said joint probability (transition probability; column 8, lines 37-60), to determine the optimal word in considering the context of a sentence.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Halstead's invention such that a score of each candidate is calculated based on a product of said joint probability, to allow the input of long words in a sentence without disturbing continuity of thought and the increase in operability (column 1, lines 7-15).

7. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Halstead, Jr. et al. (U.S. Patent No. 5,963,893), hereinafter referenced as Halstead [illegible]

Regarding **claim 9**, Halstead discloses the method wherein a comma (comma; column 10, line 66) and comparable symbols (punctuation marks; column 5, lines 22-25) are considered as division points of said objective character, but lacks specifically teaching that parentheses are division points of said objective character.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that punctuation marks, as taught by Halstead, could be considered a division point (column 5, lines 22-25), to identify where phrase breaks occur are most likely to occur within the input text (column 5, lines 19-22).

8. **Claim 18** is rejected under 35 U.S.C. 103(a) as being unpatentable over Halstead in view of Abe in further view of Yamamoto.

Regarding **claim 18**, Halstead in view of Abe discloses the character string dividing method, but lacks wherein it is checked if any word starts from a certain character position when a preceding word ends at a character position and, when no dictionary word starting from said character position is present, appropriate character strings are added as unknown words starting from said character position.

Yamamoto discloses the method wherein it is checked if any word starts from a certain character position (i) when a preceding word ends at a character position (wi; column 2, lines 25-26) and, when no dictionary word starting from said character position (i) is present (character sequence not present in dictionary; column 2, lines 63-66), appropriate character strings are added as unknown words starting from said character position (i) (column 2, lines 15-31), where said character strings to be added have a character length (character length; column 2, lines 23-31) not smaller than n (n) and not larger than m (i), where n and m are positive integers (column 8, lines 13-24

and column 2, lines 15-31), to analyze language text without using a dictionary, using a probabilistic technique.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Halstead and Abe's invention such that appropriate character strings are added as unknown words starting from said character position, to be able to pick out words or phrases in text of different languages with high accuracy and high speed (column 1, lines 14-39).

9. **Claim 19** is rejected under 35 U.S.C. 103(a) as being unpatentable over Halstead in view of Abe in further view of Hon et al. (U.S. Patent No. 5,852,801), hereinafter referenced as Hon.

Regarding **claim 19**, Halstead in view of Abe discloses the character string method wherein

a score is a sum of calculated joint probabilities at respective division points (Halstead; statistic probability for breaking; column 4, lines 25-47); and

a candidate having the smallest score is selected as said correct division pattern (figure 8, element 66), but lacks wherein a constant value given to said unknown word is larger than a constant value given to said dictionary word and a score of each candidate is calculated based on a sum of said constant values given to said unknown word and said dictionary word.

Hon discloses the method wherein

a constant value given to said unknown word is larger (unrecognized word with value of 1) than a constant value given to said dictionary word (smaller than 1; column 9, lines 20-27); and

a score of each candidate is calculated based on a sum of said constant values given to said unknown word (new) and said dictionary word (predetermined attributes; column 9, lines 36-40), to increase the probability of recognizing that word in the future.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Halstead and Abe's invention such that unknown word is given a value larger than the dictionary word and that the score is calculated based on the unknown word and the dictionary word, to improve the probability of recognizing new words in the future (column 2, lines 18-35).

Allowable Subject Matter

10. **Claim 20** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 20 discloses the character string method wherein a constant value given to said unknown word is larger than a constant value given to said dictionary word and a score of each candidate is calculated based on a product of said constant values given to said unknown word and said dictionary word. Prior art such as Abe and Hon disclose similar methods but fail to teach that these scores are calculated based on a *product* of unknown words and dictionary words.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Takaoka (U.S. Patent No. 6,539,116) discloses an information processing apparatus and method, and computer memory therefor analyzing the structure of the entered document.
- Fuji (U.S. Patent No. 6,516,296) discloses a translating apparatus, dictionary search apparatus, and translating method.
- Kantrowitz (U.S. Patent No. 6,292,772) discloses a method fir identifying the language of individual words.
- Hetherington et al. (U.S. Patent No. 6,460,015) discloses a method, system and computer program product for automatic character transliteration in a text string object.
- Okajima et al. (U.S. Patent No. 4,502,128) discloses translation between natural languages.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jakieda R Jackson whose telephone number is 703.305.5593. The examiner can normally be reached on Monday through Friday from 7:30 a.m. to 5:00p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To can be reached on 703. 305.4827. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JRJ
July 12, 2004

W. R. YOUNG
PRIMARY EXAMINER

W. R. YOUNG
PRIMARY EXAMINER